High-resolution diagnostics of solar prominences and prominence-like tornadoes

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Several observing campaigns have been carried out with the IRIS mission in coordination with other observatories to target solar prominences and prominence-like tornadoes. We focus here on observations between 2014 and 2016. The observational data is being complemented by a grid of non-LTE radiative transfer models producing synthetic Mg II line profiles. An algorithm is used to automatically extract relevant line profile parameters from the optically thick Mg II h and k lines, both on the observed and synthetic profiles. This allows us to study a large set of profiles and provide statistical results. We present our most recent findings from the combined analysis of synthetic spectra and of Mg II spectra acquired by IRIS, in terms of plasma parameters, magnetic fields, and dynamics, with the help of data from other observatories such as SDO, Hinode, the Meudon Solar Tower, and THEMIS. Implications for future high-resolution instruments are discussed.